



Show Number: 726

Steven C. Cooper, MS
Dr. Gavin Macgregor-Skinner, BVSc, MSc, MPH, MRCVS
Disinfection Technologies

Good Day and welcome to the IAQ Radio+ episode 726 blog! This week we welcomed Steve Cooper and Gavin Macgregor-Skinner for a show on disinfection technologies. What lessons did we learn during COVID and what should restorers and others watch for when purchasing and using disinfection technologies?

Gavin Macgregor-Skinner is a Senior Director at ISSA – The Worldwide Cleaning Trade Association. He has more than 30 years of technical experience in responding to infectious disease outbreaks and emergency management. He is also an Associate Professor in the Department of Public Health Sciences at Penn State College of Medicine and teaches three 15-week graduate courses on Public Health. MacgregorSkinner has appeared on CNN, Fox News, BBC and many other news outlets to share his expertise on High Consequence Pathogens.

Steven Cooper is an engineer with a technical specialty in the research and development of water-based electrostatic spray systems. He has developed innovative core technology and commercial products related to air-atomizing induction-charging (AAIC) spray systems to improve spray delivery in agriculture, human and animal health, and cosmetics. Mr. Cooper is an engineer, a scientist, as well as an entrepreneur. He is the co-founder of ByoPlanet and has been involved in establishing several other successful companies. Mr. Cooper received his undergrad and master's degrees from the University of Georgia and has been continuously involved with the UGA Applied Electrostatics Laboratory for over three decades.

Nuggets mined from today's episode:

What have we learned from COVID?

Dr. Gavin Macgregor-Skinner- Contrary to common misconception, the cleaning industry is not an unskilled work force. The cleaning industry is an essential industry which utilizes science and best practices to clean buildings safely, efficaciously and

efficiently using science (e.g.- chemistry, engineering, etc.) The cleaning industry is underrecognized and underappreciated.

Steven Cooper-The fear and panic of COVID drove people to seek a *silver bullet*. People jumped onto electrostatic sprayers as an answer, but not all electrostatic sprayers are the same, some are very good for applying disinfectants but many that flooded the market were not effective and the public was often deceived. Businesses fought to stay open and make their premises safe for consumers. Some businesses purchased disinfection chemistry and spray equipment to treat their own buildings, while others relied on others for building treatment. Some businesses were driven out of business by COVID, while opportunistic businesses sought to profit within the chaos by providing disinfection services. Everyone wanted to spray something and show customers they were doing something. As an industry leader in electrostatic spraying technology, we kept our eyes open. Involvement with GBAC (Global Biorisk Advisory Council) provided a systems approach to: training, equipment and chemistry. During the time of COVID chaos, many other sprayer manufactures brought sprayers onto the market that they called “electrostatic” but did not perform well and, when measured, had very low or non-existent electrical charge and poor spray coverage. The University of Georgia has now helped to develop standard methods to qualify an electrostatic sprayer as a response to this opportunistic marketing and unfortunate deception by some manufacturers during COVID.

Dr. Gavin Macgregor-Skinner-Dr. Michael Berry’s book, *Protecting the Built Environment, Cleaning for Health* (1994) is the foundation for GBAC training. Under a grant from the US Dept. of Labor; GBAC created and taught 54 workshops throughout the US in which 850 people were trained. The attendee survey found that 95% of attendees had not been to a training course in over 5 years and many could not name the active ingredient or solvent in the products they routinely used. Dr. Berry’s vision of “Cleaning for Health” is the foundation for 4 different workshops in which “adults learn by doing”. The course is available in 8 languages. The course teaches the underlying science of the items contained in a cleaning cart in a fascinating way: tools, products, chemistry. The attendees are taught to do their job based upon evidence and science. Instruments such as: UV lamps, ATP, UVLED lamps, BactoScan®, real time PCR testing are used to quantify performance results.

Gavin’s field experience in war zones monitoring for bioweapons involved use of a suitcase sized real time PCR monitoring instrument, now the instrument is the size of a cell phone.

After visiting the *Innovation Exhibits* at trade shows, Gavin is waiting for big, exciting things to happen!

Steven Cooper- In general, conventional spraying is not an efficient process due to obstacles such as: gravity, air currents, boundary layers. Electrostatic spraying is designed to improve coverage and put droplets on the intended target surface. When correctly designed, electrostatic spraying adds charges to the droplets to produce a strong force that attracts them towards the target. The electrostatic sprayer harnesses the same attractive force that causes our clothes to stick together when tumbled in the clothes dryer or attaching a balloon to a surface after rubbing it on our hair. When used to apply disinfectants; the technology can deliver droplets into hidden areas and greatly improve overall spraying efficiency.

Electrostatic spraying isn't new. Charges were added to droplets in the 1700s during Ben Franklin's time to show the concept and provide demonstrations. Different charging options are available and the correct choice depends on things such as the type of spray material being applied and the situation. The type of charging depends on the type of material being applied. Different charges are used to deposit powders or paints than are used to deposit water-based disinfectants. Electrostatic sprayer types should not be lumped together because of technological differences and there are wide ranges in performance. Some devices are great and some not so great. Due to his affiliation with the UGA (University of Georgia's Electrostatic Lab), Steven was able to have testing conducted on 19 different new sprayers and found that most of these made untrue and outlandish advertising claims i.e.: 360° coverage, spraying the front of a refrigerator will also deposit enough droplets to coat the back, often the sprayers lacked adequate propulsion to put droplets on distant targets, etc. The results were that the competitive brands of sprayers were found to have used inappropriate methods to try and charge highly conductive (salt containing) disinfectants, were unable to achieve 360° coverage, were unable to propel droplets to distant targets, etc. According to the UGA study, only AAIC (Air Assisted Induction Charged) technology was demonstrated to work. <https://engineering.uga.edu/from-agriculture-to-covid-disinfection-technology-developed-at-ugacontinue/> Unfortunately, due to a combination of fear and panic logic was forgotten. Many cleaning and restoration contractions were deceived; even the UGA was conned into purchasing costly ineffective equipment. The combination of the right training, the right equipment and the right chemistry are needed to achieve the best results.

Electrostatic sprayers, if designed correctly, can be extremely effective to enhance spray deposition and be very simple to use. Testing shows AAIC types of electrostatic sprayers can achieve a 5-15-fold increase in droplet deposition with disinfectants when spray charge is activated compared to conventional un-charged spraying or foggers.

Dr. Gavin Macgregor-Skinner-In my work with high consequence diseases and bioweapons spraying is always part of the protocol. When setting up Ebola hospitals where there was a 60% fatality rate, we would thoroughly wet (drench) surfaces with an appropriate disinfectant to ensure there was no viable virus. Gavin has established methodology for fast, efficient, and effective disinfecting for the NFL, NBA and other sports. Disinfection is a system not a product or device.

Gavin has used electrostatic sprayers to apply fentanyl neutralizing solutions.

The response to COVID was overdone. We can't always wait for government intervention and regulation. We need testing in real world situations. Gavin is working on bringing science, industry, academia, service providers and stakeholders together.

We have reputable peer reviewed cleaning industry journals. The government and academia should accept articles and papers.

Infection transmission is real. All it takes is touching a microbe contaminated surface and then touching an opening in our body (eyes, nose, mouth, cuts and abrasions). Gavin is an advocate for building antimicrobials into products such as airline armrests and tray tables. Indoor spaces have complex geometries which harbor microbes. Floors are the largest indoor surfaces and play a role. We have good data on cleaning and disinfecting floors.

When it comes to cleaning and disinfection indoors, time is our biggest enemy. Delivery systems such as electrostatic spraying save time, an electrostatic sprayer can cover 18,000 sq ft per hour, with a 2-minute dwell time. Gavin supports a move to evidence-based efficacy. The CDC has provided contradictory information regarding COVID <https://www.cdc.gov/coronavirus/2019-ncov/php/ehpractitioners/sprayers.html>

When COVID emerged, Gavin consulted with 3 professional sports teams that were using disinfecting wipes and after demonstrating proven methodology, converted them to electrostatic spraying.

Which chemistry will not work with your systems? Steven Cooper- Thick oily substances are not recommended, but there are not many of those types of chemistries out there. Most formulations are water-based and those all work well in our electrostatic sprayers. Our systems will apply a very wide range of antimicrobials. We prefer and recommend safer types of antimicrobial products. The pathogen and situation drive the selection of chemistry, but since our electrostatic sprayers greatly improve spray coverage, most all chemistries can become more effective because they are better placed at the pathogen site. AAIC types of electrostatic sprayers incorporate air-propulsion to push the charged spray

into hard-to-reach areas and can speed up the spraying process. Air propulsion, coupled with high level of electrostatic charge, assists in putting the chemistry where it needs to be, especially in areas that have more complex target surfaces. The real world needs fast effective spray application, some examples are the back of an ambulance, patrol cars, locker rooms, medical rooms, animal boarding facilities, cruise ship areas, food preparation and storage areas, etc. All these areas need to be treated fast and effectively.

We are actively working in animal health. Dogs are social animals, doggie daycares and animal shelters are a growing market for us because the spray technology works so well to cover complex targets and is fast to apply. The equine industry is also benefiting from infection control and odor control protocols involving our spray systems. Horses are some of the most travelled athletes, but pathogens are also travelling.

Depending on the situation we also provide solid chemistry options: for example, HOCL (hypochlorous acid) as well as quat and CLO₂ (chlorine dioxide) hybrid. We offer a biostatic silane quat technology that can provide long lasting 30–90-day protection. These types of products have a long history of being effective with AAIC electrostatic spray technology. The cruise industry is one example of success of using our equipment used with effective chemistry against pathogens such as those that cause norovirus.

Does electrostatic spraying have any benefits to IAQ? Steven Cooper- Yes...

Electrostatic sprayers are effective at removing airborne particulates upon which microbes, pathogens and chemicals are found and can be transported.

Electrostatic sprayers are LP/VV (low pressure and low volume) applicators that apply chemistry more efficiently so less chemicals are introduced into the air as lingering aerosols.

The droplet size created by recent AAIC electrostatic sprayers (30-80 microns) is an optimum size for disinfecting and not so small that droplets are ineffective and drift away or are readily respirable or create excessive VOCs. Electrostatic forces speed up the deposition process and charged particles don't linger in the air nearly as long as uncharged particles.

Electrostatic spraying for comfort? Steven Cooper- We also do make similar airatomizing sprayers that are being used successfully to prevent heatstroke by providing skin cooling for athletes and workers. Another very interesting, effective technology.

RoundUp

What about the mantra clean first and then disinfect? Dr. Gavin Macgregor-Skinner- There is both visible soil and invisible soil. You can't see invisible soil without a microscope or ATP. In situations such as crime scenes, electrostatic spraying is done first as a method of risk reduction. Coverage is important, we are not trying to disinfect, we are trying to lower the risks.

The technology and chemistry have been established; now we need to provide the training. We need to share the success stories to attain the acknowledgement.

Making Safer Choices "The ISSA proudly announces a new partnership with Penn State College of Medicine and The City College of New York School of Medicine (CUNY Med) to improve human health and the environment in disadvantaged communities across Pennsylvania and New York. The initiative will be funded by a US \$1.19 million Pollution Prevention (P2) grant from the U.S. Environmental Protection

Agency (EPA). ISSA's collaboration with Penn State and CUNY Med makes it one of 24 recipients selected by the EPA across the country."

<https://www.issa.com/articles/making-safer-choices>

We were asked to create *Making Safer Choices* "tool kits"; we will use a holistic approach by sending shipping containers full of cleaning tools and products to the selected areas.

Steven Cooper- Be an educated consumer, ask questions, request data and documentation.

Many advances have been made in electrostatic sprayers for applying disinfectants. Look for AAIC (air-atomizing induction-charging) technology since it has been specifically designed for disinfectants. Modern disinfectants are very electrically conductive and AAIC systems have been designed to electrically charge them more effectively and consistently for the best result.

Electrostatic spraying can provide many benefits for improving spray coverage, especially on hidden areas and complex geometry targets. Improved coverage can improve the pathogen control result. But make sure the device manufacturer can provide satisfactory data on spray charge, droplet size and spray deposition improvements because not all "electrostatic sprayers" are the same. Select the appropriate chemistry, select the most effective technology sprayer system, and have the needed training to do the job right.

How much does an electrostatic sprayer cost? Adrian Fulle - ByoPlanet Global Chief Marketing Officer- A quality electrostatic sprayer can be purchased for \$500-\$700, but don't let the equipment cost scare you. We offer significant discounts when sprayers are purchased along with qualifying quantities of chemistry. We have

special programs for educational organizations, nonprofits, and many others. The health and wellbeing of the occupants is our main mission.

What novel fire restoration sales strategy has proven effective for some of your customers? Adrian Fulle- ByoPlanet Global Chief Marketing Officer- As part of the initial visit and estimate, they provide a free deodorization demonstration in a room using the electrostatic sprayer and our HOCL product. It quickly eliminates the odor and leaves the room smelling fresh and clean.

Z-Man Signing Off

TRIVIA-

Who is the holder of US Patent# 2,247,963?

Answer:

Harold P. Ransburg Sorry there

was no correct answer.